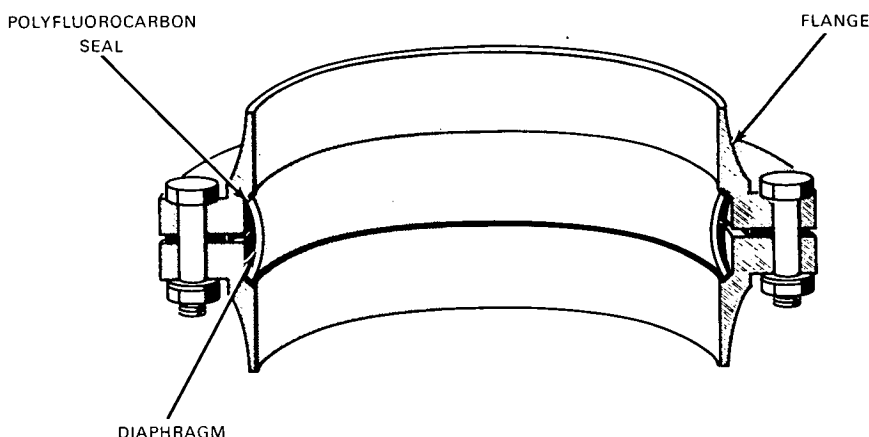


# NASA TECH BRIEF



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## Diaphragm Eliminates Leakage in Cryogenic Fluid Duct Coupling



**The problem:** To provide an inexpensive duct coupling that will be leakproof when used with cryogenic fluids. Standard couplings shrink because of the extremely low temperatures of the fluid, causing the coupling or joint to leak. Some couplings are designed specifically for cryogenic fluids, but are unduly heavy and expensive.

**The solution:** A nickel steel diaphragm of low thermal expansivity placed between the two flanges of the coupling reduces axial shrinkage at the coupling flanges to a minimum.

**How it's done:** The cylindrical diaphragm is placed between the two flanges, as shown in the illustration. The diaphragm has smooth rounded edges which seat in the radius of the flanges. A thin polyfluorocarbon seal is placed between the diaphragm and the flanges.

### Notes:

1. This coupling is inexpensive to manufacture because the diaphragm allows loose machining tolerances on the flanges. Any shrinkage of the flange bolts is beneficial to the seal. Radial shrinkage and internal fluid pressures improve the sealing characteristics.
2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer  
Western Operations Office  
150 Pico Boulevard  
Santa Monica, California, 90406  
Reference: B65-10227

**Patent status:** NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: Douglas Aircraft Company  
under contract to  
Western Operations Office  
(WOO-142)

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